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Evoking Emotion through Stories in Creative Dementia Care

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Abstract. This paper reports research to refine the design of a mobile creativity support app to improve person-centred care for older people with dementia. One barrier to previous app use during creative thinking appeared to be the negative activation emotions associated with problem avoidance and prevention exhibited by care staff when resolving challenging behaviours. Therefore we investigated the redesign of the app's content so that care staff were more likely to positive activation associated with creative thinking through storytelling through a first formative evaluation.

Keywords: Dementia care, case-based reasoning, creativity, emotions, moods.

1. Dementia Care and Creativity

Dementia is a condition related to ageing. After the age of 65 the proportion of people with dementia doubles for every 5 years of age so that one fifth of people over the age of 85 are affected. This equates to a current total of 750,000 people in the UK with dementia, a figure projected to double by 2051 when it is predicted to affect a third of the population either as a sufferer, relative or carer [14]. Dementia care is often delivered in residential homes. In the UK, 4 in 5 of all home residents have some form of dementia [13], and delivering the required care to them poses complex and diverse problems that new software technologies have the potential to overcome.

The prevailing paradigm in the care of older people with dementia is person-centered. This paradigm seeks an individualized approach that recognizes the uniqueness of each resident and understanding the world from the perspective of the person with dementia [5]. It can offer an important role for creative problem solving that produces novel and useful outcomes [12], i.e. care activities that both recognize a sense of uniqueness and are new to the care of the resident and/or care staff. However, there is little explicit use of creative problem solving in dementia care with and without technical support, in spite of its potential benefits to both improve care and reduce the stress associated with caring for people with dementia [7].

During design studies, care staff demonstrated the greatest potential and appetite for the Other Worlds technique [1] that exploits similarities between domains. There-

fore the challenge became how to implement the different forms of similarity-based reasoning for creativity in person-centered care work. In its standard form, the Other Worlds technique requires both facilitated guidance to explore the different worlds and communication between participants to share ideas [1]. Neither was possible regularly in constrained residential home settings. Therefore, we decided to implement a mobile software app to support the technique. In the place of human facilitation, the app retrieves then guides care staff to explore similar concrete cases from dementia care in other residential homes, and in other worlds. And in place of face-to-face communication, the app supports asynchronous communication between care staff through a digital repository of the shared cases from dementia care and these other domains. The app, called Carer, was rolled out for use in participating UK residential homes to support care staff to manage the challenging behaviors of residents.

The Carer app delivers creativity support to care staff using creative guidance based on similar cases resolved previously in different forms in other domains. These cases are harvested from both experienced care staff in other residential homes who are rewarded to share good care practices, and from our own researchers who collect successful challenging behavior cases from non-dementia care domains such as policing. However, although care staff did successfully use the app to create new care plans to resolve behaviors demonstrated by residents [15], the evaluations did reveal barriers to creative thinking in dementia care. One such barrier was the emotions demonstrated by care staff when using the app to resolve a challenging behavior – emotions that appeared to inhibit their creativity. In this paper we report research to promote positive activation emotions in care staff who are using the Carer app.

2. The Carer Mobile App

The *Carer* mobile software app was developed to support care staff to generate new ideas with which to reduce challenging behaviours using 3 forms of the similarity-based *Other Worlds* technique. To support the generation of ideas in less constrained worlds as piloted in the design study [15], the app presents different non-dementia worlds to care staff in which such ideas can be generated. To support the generation of ideas that build on knowledge about ideas already generated in some of these different worlds, the app presents resolutions to challenging behaviours encountered in these worlds in order to encourage analogical reasoning. And to support the generation of ideas that build on knowledge generated in other residential homes, the app presents knowledge about how these challenging behaviours were reduced successfully by care staff in these other homes.

We designed the app to be effective with minimum training. A member of care staff can describe each challenging behavior situation encountered using unrestricted natural language such as:

Mrs. X acts aggressively towards care staff and the resident verbally abuses other residents at breakfast. Suspect underlying insecurities to new people.

using the mobile device keyboard. The member of care staff can then select to use one of the different forms of the *Other Worlds* technique to generate and record ideas, reflect on them, then propose a change to the resident's care that can be shared with other care staff, all using the mobile app. To deliver this level of functionality to care staff via mobile devices, we implemented a service-oriented architecture with: (i) an iOS v5 client app that the carer interacts with via an iPod Touch device; (ii) server-side digital repository of descriptions of past cases shown to reduce challenging behavior, and; (iii) server-side computational services to implement the different forms of the *Other Worlds* creativity technique. An example of a case retrieved by the *case-based reasoning* discovery service that matches the description of a challenging behavior situation to descriptions in the repository of challenging behavior cases in dementia care, as shown on the left side of Figure 1. A *creativity prompt generation* service then automatically generates statements from retrieved good care practices that the care staff can use to generate new ideas. Examples of these prompts generated for the *managing a disrespectful child* case are shown on the right-hand side of Figure 1. Moreover, at any time when reading retrieved case descriptions and creativity prompts, care staff can audio-record a new idea by pressing the red button visible in Figure 1 then verbalizing and naming the idea.



Fig 1. The Carer mobile app showing a retrieved description of good care practice (left side) and creativity prompts generated from that description (right side)

Of course, the quality of support provided by the app for creative thinking is dependent on the content of the digital repository of over 100 cases of good care practice in dementia care and other worlds that are accessed by the case-based and analogical reasoning discovery services. The structure of all of these cases is based on the structure of dementia care case studies reported by the Social Care Institute for Excellence [11]. The repository is implemented using eXist, an open source native XML database featuring index-based XQuery processing that the discovery service queries using XQuery, a query language designed for processing XML data. The XML struc-

ture of each case description has two main parts of up to 150 words of prose each – the situation encountered and the solution applied – and is attributed to the class of domain to which the case belongs. Moreover, all cases in the repository were originally documented using neutral terms, an example of which is provided in Figure 2. In each case the resident is not named, and the situation only described in terms of the observable challenging behaviour, resulting problem and successful outcome.

An older resident with Alzheimer's has recently moved to a residential home. Although formally an active man, he is not integrating well. He does not undertake many activities, during the day and sits in the lounge for long periods looking out of the window. He is becoming increasingly agitated, and is showing the first signs of depression. According to his relatives, he was keen at woodwork and other outdoor hobbies. A discussion with carers revealed that continuing such hobbies imposes a health risk to both the resident and carers.

The carers decided to offer a simplified version of his hobbies in the care home. The management decided to convert an unused shed into a safe place for the resident to practice his hobbies. They managed to create some simple wood-work activities based on his interests. Each of the available activities was error-free, to encourage a sense of success. Carers with the resident gave both visual and verbal instructions, and even guided his arms gently when needed. As a result, the resident was able to engage more generally with other residents, and became less agitated over time.

Fig 2. One original case description from the digital repository

This reporting style was implemented for 3 reasons. The first and most important one was to replicate the style of the dementia care cases reported by the Social Care Institute of Excellence [11]. As well as being an accepted style of reporting in the sector, it ensured resident anonymity. A second reason was to facilitate the automated retrieval by the service algorithms that the Carer app invokes – neutral terms are easier to disambiguate and expand to match to terms describing an encountered challenging behaviour using the automated algorithms. The third reason was that we assumed that care staff would prefer to read and work from facts rather than other forms of stories. Therefore the same style was adopted to describe all non-dementia care cases in the repository. However, whilst both laboratory evaluations and in-situ trials revealed that users often treated the app as an aid for problem solving triggered by negative activation emotions – emotions not associated with creative thinking.

In light of these results, we identified a number of possible changes to the *Carer* app and its rollout in residential homes. One was to extend the training given to care staff so that it both increased the awareness of creativity during care as well as provided more skills in the different creativity techniques. Another was to evolve the residential home's climate to make it more conducive to creative thinking, for example through the use of role play techniques that establish creative collaboration between residents and staff as the norm. These changes, along with modifications to app features to increase the number and perceived randomness of the case descriptions and creativity prompts presented to care staff, have been implemented in on-going residential home trials of *Carer*. However, one change not made at the time was the app's content – the neutral descriptions of the cases exemplified in Figure 3. We were concerned that this style of case description might have contributed to the negative activation emotions in care staff. Therefore, to better understand possible associations between the app's case content and creative thinking by care staff, we undertook a

review of the literature that associates emotion and mood with creativity and creative outcomes.

3. Emotion, Creativity and Storytelling

Research that has investigated associations between human emotions and creativity is not new – indeed it is well established. For example Baas et al. [3] undertook a comprehensive meta-analysis of over 100 mood-creativity research studies based on how humans regulate their goals, emotions and behaviour using the promotion and prevention motivational systems [8]. People operating under a promotion focus are goal-oriented and engage in activities leading to desired end-states, whilst people under a prevention focus are oriented towards security and tend to engage in behaviours to avoid negative outcomes. Using this baseline, the meta-analysis [3] revealed that:

- Emotions and moods can be effective predictors of human creativity and creative outcomes;
- Positive human emotions and moods produce more creativity than emotion- and mood-neutral controls;
- Creativity is enhanced more by positive emotion and mood states that are activating and associated with an approach motivation and promotion focus (e.g., *happiness*, *upbeat* and *elated*), rather than those that are deactivating and associated with an avoidance motivation and prevention focus (e.g., *relaxed*, *serene* and *calm*);
- In contrast negative, deactivating emotions and moods with an approach motivation and a promotion focus (e.g., *sadness*) were not associated with creativity, but negative and activating moods with an avoidance motivation and a prevention focus (e.g. *fear* and *anxiety*) were associated with lower creativity, especially when assessed as cognitive flexibility.

These meta-findings suggest that, if the *Carer* app is to encourage care staff using it to be more creative, then the app should encourage positive emotion states that are activating and associated with an approach motivation and promotion focus, i.e. *happy*, *upbeat* and *elated* rather than those that are deactivating and associated with an avoidance motivation and prevention focus such as *relaxed*. This contrasts with the observed negative and deactivating emotions indicated by the data collected during the app evaluation studies. But how to evoke positive emotion states that are activating and associated with an approach motivation and promotion focus?

One means to evoke such emotions in care staff is through more effective storytelling based on the case descriptions that the app accesses. For example, [6] reviewed the role of storytelling in different cultures. A repeating theme in our stories is the journey of a hero who accepts a task with a challenge to achieve, receives help to undertake the task, and achieves eventual victory and enlightenment. This journey, Campbell argued, is intrinsic in both social storytelling and our unconscious. He made direct comparisons between elements of a hero's journey and dreams, which often associate the hero with society as a whole. He argued that people have an innate reac-

tion to stories established through years of encountering, reading and hearing them. When faced with a story arc, it is a natural desire to see the story resolved and the hero saved, rewarded and enlightened. Indeed, interactive storytelling seeks to manipulate and react to the emotions of users [4] to manage the emotional journey of an audience. Alm & Sproat [2] argue that the storytelling genre is rich in emotional content, and storytellers use a range of specific emotions to manipulate the emotional responses of the listener.

But could storytelling through a creativity support app evoke more positive emotion states, an approach motivation and activation focus in care staff who encounter challenging behaviours in older people with dementia? To find out we undertook a first investigation to explore possible effects on care staff behaviour and inform the development of an outline descriptive model of storytelling in dementia care.

4. A First Formative Study

We drew on evidence of associations between storytelling, emotion and creativity to undertake a first study that investigated the effect of different styles of case descriptions on the generation of creative ideas by care staff to improve the care of a fictional resident exhibiting challenging behaviour. To do this we applied creative writing techniques to develop 3 versions of one dementia care case in the *Carer* app's digital repository. We then made these different versions of the case available to care staff to investigate the effect on the outcomes of an exercise to improve the resident's care. The 3 different versions of the case description were:

1. The original neutral case description;
2. The same description rewritten with creative writing techniques to manipulate the emotions of care staff that read the case description towards positive activation and promotion focus;
3. The case description rewritten with the same creative writing techniques but to manipulate the emotions of care staff towards negative activation and prevention focus.

Different pairs of care staff asked to generate ideas with which to resolve a challenging behaviour with a fictional resident with dementia were each given one of these case descriptions to support them. The original dementia case description was selected from the repository using 3 criteria:

1. It was between 150 to 200 words long, so that it could be extended without becoming too long to read and use in the study;
2. It described an effective resolution of challenging behaviour in dementia care, but was still open to creative thinking to resolve similar behaviour differently in different contexts;
3. It had sufficient content to support emotive changes to the case description.

The case descriptions in the repository that satisfied these criteria included cases to *create meaningful activities for a resident*, *resolving a desire to return home* and *establishing routines*, however we selected the case described in Figure 3 as best-fit the

case to rewrite. The two new descriptions of the case were written to evoke positive emotions with an approach motivation and promotion focus and negative emotions with an avoidance motivation and prevention focus, as identified in the meta-analysis [3]. Neutral terms in the case were replaced with positive and negative phrases, and additional words were added to evoke the sought emotional response. In the positive emotion case, the resident was given the name *Joe* and in the negative emotion case he was referred to as *Mr Brown*. The original sentence ‘*he sits in the day lounge for long periods looking out of the window*’ became ‘*Joe has tended to spend time relaxing in the day room, looking out of the window*’ in the positive version, and ‘*Mr Brown has been reduced to spending long hours staring longingly out of the day room window*’ in the negative version. Expressions such as ‘*the sun pours through the windows*’ and ‘*trapped in the shadows*’ were added to selected sentences to evoke further emotional responses. Both revised case descriptions are reported in Figure 5. The original 186-word case description was lengthened to 233 words in the positive case description and 239 words in the negative case description.

Joe has recently arrived at a pleasant home for people with Alzheimer's. He is a cheerful man with a passion for the outdoors. As the sun filters through the windows of the day room he relaxes in a comfy chair enjoying its warmth and letting the gentle chatter of his fellow residents roll over him as a pleasant backdrop to his day. In this way he spends his time in his own world, enjoying his own thoughts. As his family starts to see the first shadows of a low mood sneaking up on Joe, they start to share stories, reminding Joe and telling the staff around him of his favourite times: fixing Molly's chair in the shed, fishing by the river with the boys, taking fresh vegetables to his wife to prepare a hearty meal for their family. As they paint pictures of Joe's past, the staff see the joy of the memories touch his face and think of ways of keeping him smiling.

They join together to convert the home's old shed into a workroom for Joe. Now he shares his time between that comfy chair watching the world wander past, and enjoying the walk in the sunshine to his own safe world. There, in the warmth of the workroom, the supportive staff help him to hold onto the happy memories of his past and create new ones in his present too.

Once an active man, Mr Brown is now stooped and greying, ravaged by old age, he is reduced to life in a home that he does not know, cared for by people who are not his family as Alzheimer's takes hold of his mind. His days are spent in the same room, trapped in the shadows as he looks out at what he cannot enjoy, and surrounded by other residents he no longer has the energy to engage with. Although his memories fade he bitterly holds on to images of vegetable patches full of life and woodwork projects completed with pride and admired by his children, as he looks out at a flowerless garden.

The same children that once admired his carpentry now lament the loss of their father and desperately hold onto the same images from his past. They share with the staff the person he once was and paint a picture of a man full of life and activity. It is hard it is the same man before them all, racked with depression and seeking refuge in his own thoughts, which in his current condition just confuse him further. The staff urgently seek information from his family, and try to recapture something of Mr Brown's past passion. Setting up a woodwork room in the home's shed they hope they can reawaken Mr Brown a little and bring back some of the man that is so clearly missed.

Fig 3. The rewritten positive (top) and negative (bottom) case descriptions

The purpose of the first study was to seek first evidence of an effect of different styles of case description on the volume and novelty of ideas that staff who care for older people with dementia generate. Based on the body of evidence reported in the meta-analysis, we posited two research predictions:

1. Care staff who received the positive version of the case would generate more ideas than care staff who received the neutral and negative versions of the case;

2. Care staff who received the positive version of the case generated ideas that domain experts ranked as more novel than ideas that care staff who received the neutral and negative case generated.

We investigated these predictions through quantitative and qualitative analyses of data collected from professional care staff and domain care experts.

4.1 Study Method

A total of 24 professional care staff from 4 UK residential homes volunteered to take part in the study, working in pairs from the same home. All of the participants were professional care staff with experience of working with people with dementia daily. Each care staff pair participated in the study at the residential home at which they worked. All agreed to participate in the study and signed consent forms that allowed them to withdraw at any time and to withhold data as needed. Each pair worked in isolation from each other pair, and was instructed to generate ideas that could make a resident called Mrs Smith more comfortable and engaged in her residential home. Each pair were informed that Mrs Smith has dementia and has been a residential home about 2 months – it was her first experience of residential care. She spends a lot of time in her room, is very clingy to particular staff and shows no interest in socialising with other residents. After conversations with her family they have discovered important facts such as she has 2 daughters and 5 grandchildren, was a housewife most of her life, loves cookery programmes, and attends the Chelsea Flower Show.

Each care staff pair was allocated to one of the 3 experimental conditions to receive either the: (1) original case description – the neutral condition; (2) case description written to evoke positive emotional responses – the positive condition, or (3) case description written to evoke negative responses – the negative condition. Each care staff pair were asked to generate new ideas that could be used to improve the care of Mrs Smith using the case description given. The allocation of pairs to conditions is defined in Table 1. We planned for 12 pairs to undertake the task, but residential home C was unavailable to provide a 3rd pair due to work commitments on the day of the research visit. No replacement was found.

Table 1. The allocation of the care staff pairs to the three experimental conditions

Experimental condition	Residential home A	Residential home B	Residential home C	Residential home D
Negative	Pair 1	Pair 4	Pair 7	Pair 9
Positive	Pair 2	Pair 5	Pair 8	Pair 10
Neutral	Pair 3	Pair 6	-	Pair 11

During the study, each pair worked in a quiet room in their residential home containing a printed set of the instructions that included the challenging behaviour of a

resident to manage, a printed version of the case description placed facedown on the desk, an additional set of 3 creativity prompts also in printed form in a bag, flipchart sheets, coloured post-its, coloured pens, and other sheets of paper for note-taking. At the start of each pair's task, a researcher read the instruction sheet aloud to allow for any questions to be raised and to ensure that all instructions were understood. The instructions directed each pair to:

1. Read information about the fictional Mrs Smith and her challenging behaviour;
2. Read the printed case description that each pair was informed had been selected to guide them to generate ideas with which to manage the challenging behaviour;
3. Generate as many ideas as possible in 20 minutes to improve the care of Mrs Smith. Each pair was requested to write each idea on a separate post-it;
4. As needed, select one prompt at a time from the bag as needed to support further idea generation during the 20 minutes. Each prompt was generated by researchers according to the *creativity prompt generation service* invoked by the *Carer* app.

Each pair was left alone during the 20-minute exercise but the conversations were audio-recorded. At the end of the 20 minutes, the researcher returned to the room to stop the exercise and collect all post-it sheets for analysis.

After all of the pairs had completed the idea generation exercise, the researchers counted the number of separate ideas generated by each pair. A subset of these ideas was then selected for assessment by a panel of dementia care experts if: (1) the idea was generated by only one pair, to enable cross-condition comparison, and; (2) the idea contained a full, clear and concrete action. For example, ideas such as *Gain her trust* were deemed incomplete, and *Fulfilling her needs* were too essential to the nature of person-centred care, so both were not taken forward. This not only removed obvious ideas generated by multiple pairs of care staff, but also made the task of idea ranking more manageable and hence achievable by the dementia care experts available to the researchers. All remaining ideas were made available to the panel of 6 dementia care experts, all of whom or had been residential home managers, via an online questionnaire. Each dementia care expert was asked to rank each idea generated by the pairs on three Likert 1-5 scales, independently of each other expert on the panel. These scales were derived from accepted definitions of creative outcomes that are both novel and useful with respect to some purpose or value [12]: how original is the idea in dementia care, useful/beneficial do you think this would be/do you think it could achieve its aim, and practical is this idea more generally in a residential care home setting? The relative scarcity of dementia care domain experts, combined with our lack of control over variables such as their backgrounds and experiences, meant that statistical analyses of the collected data was limited.

4.2 Study Results

All 11 pairs of care staff completed the task and generated a total of 197 ideas about how to care for Mrs Smith. Table 2 lists the total numbers of distinct ideas generated by each pair from the written post-it notes and audio-recordings of each conversation.

Table 2. The total numbers of ideas generated by each care staff pair

Negative condition				Neutral condition			Positive condition			
Pair1	Pair4	Pair7	Pair9	Pair3	Pair6	Pair12	Pair2	Pair5	Pair8	Pair11
14	20	8	14	20	16	12	19	15	38	21

The results in Table 2 reveal that the pairs of care staff provided with the case description written to evoke positive emotion states that were activating and associated with an approach motivation and promotion focus generated on average more ideas (average number = 23.25) than the pairs of care staff provided with the original neutral case descriptions (average number = 16), who in turn generated more ideas than the pairs of care staff with the case description written to evoke negative, deactivating emotions and moods with an approach motivation and a promotion focus (average number = 14). One pair in the positive condition, Pair 8, generated almost twice as many ideas as any other care staff pair.

We analysed the 197 generated ideas for their uniqueness, completeness and concreteness. A total of 30 of the 197 ideas were identified as unique, complete and concrete, and were rated by the 6 domain experts. The average rankings for each pair in each of the 3 conditions are reported in Table 3.

Table 3. The average domain expert rankings of the 30 unique, complete and concrete actions

Experimental condition	Practicality of idea	Originality of idea	Usefulness to person care
Positive	4.0	2.5	4.2
Neutral	4.1	2.1	4.2
Negative	4.6	1.6	4.7

Table 3 reveals a high average ranking of the usefulness of the ideas generated for the person being cared for – the fictitious Mrs Smith – in all 3 conditions. Only one of the 30 ideas was ranked average below 3.0 – *to invite an established theatre group that runs productions that the residents can take part in within a home*. In contrast, 3 ideas were ranked by all 6 experts as having maximum usefulness to Mrs Smith – one idea in each condition. These ideas were to *encourage the family to come to an event in the garden to see what Mrs Smith has produced*, *have Mrs Smith paint pictures of the past so that care staff can know her better*, and *keep the general practitioner involved to ensure that medication is reviewed*. The data indicates that the care staff given the case descriptions were able to generate ideas that domain experts ranked as relevant for the fictitious Mrs Smith, but the ideas generated in the negative condition were ranked more relevant and useful than ideas generated in the other conditions.

Table 3 also reveals high average rankings of the practicality of the ideas in residential homes across the 3 conditions. Again, only one of the 30 ideas ranked average below 3.0, *to invite an established theatre group that runs productions that the residents can take part in within a home*, and 3 ideas were ranked by all 6 experts as having the highest possible practicability in residential homes. Two of these ideas were

generated by pairs of care staff in the negative condition - *find out how Mrs Smith likes to be addressed to help her feel comfortable, and take residents to her room to meet her, if she is reluctant to leave*, and the third, *keep the general practitioner involved to ensure that medication is reviewed* was generated by a pair in the neutral condition. This result suggests that the care staff generated practical ideas that can be implemented in residential homes.

In contrast, Table 3 reveals that the expert ranking of idea novelty was lower, indicating most ideas not deemed novel in domain of dementia care by the 6 experts. A total of 4 ideas were ranked on average at 3.0 or more, 3 of which were generated by care staff in the positive condition and 1 in the neutral condition. The 3 ideas generated by pairs of care staff in the positive condition were *encourage Mrs Smith to create table decorations, use different colour codes to settle her*, and *have Mrs Smith paint pictures of the past so that care staff can know her better*, and the one idea generated by care staff in the neutral condition was *keep the general practitioner involved to ensure that medication is reviewed*. In contrast, 5 ideas were given a lowest possible novelty ranking by all 6 experts, and 4 of those 5 ideas were generated by care staff in the negative condition, with the 5th generated by care staff in the neutral condition.

5. Conclusions and Future Research

Results reported in this research indicate that care staff given a positive version of the case description generated more ideas, and domain experts rated these ideas as more novel, whereas care staff given the neutral and negative versions generated ideas rated as more useful and practical. Of course, any conclusions that we can draw at this point are subject to numerous threats to their validity that we lack space to report here. That said, the results revealed some outcomes that inform future research about the use of human emotions in the design of the creativity support app. One was the rejection of the case by one pair of care staff due to gender differences – future versions of Carer might need to categorize cases in its repository and refine matches according to case attributes such as gender. Another most important outcome was the emergence of possible trade-offs between generating novel ideas – with positive case descriptions – and more useful and practical ideas – with negative case descriptions. One possible consequence is that the Carer app’s repository should hold both positive and negative case descriptions that can support care staff during different creative and uncreative care tasks. The results also inform future research to investigate and model associations between case styles, emotions of care staff and creative outcomes under the constraints imposed by dementia care in residential settings.

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